APPENDIX M

Basis of Cost Estimate Memorandum

Cost Appendix M

South San Francisco Bay Shoreline Study

U.S. Army Corps of Engineers, San Francisco District

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Basis of Cost Estimate

The cost estimate for the South SF Bay Shoreline Study was developed jointly by HDR and USACE San Francisco District. The cost estimate is based on USACE cost estimating standards and the combined cost estimating knowledge and judgment of both HDR and USACE as it applies to civil works projects. This memo describes the key assumptions applied during the production of the cost estimate.

General Assumptions and Qualifications

1. This estimate specifically excludes the following:
    a. Permit and Plan check fees
    b. Testing and Inspection
    c. Owner's administration and other soft costs, except for real estate estimate where administration fees were developed by the USACE real estate team
    d. Cost escalation beyond the assumed construction schedule

2. The work will be constructed in multiple phases.

3. All work will be done during regular working hours (8-hours/day) with no overtime considered.

4. FRM options will be constructed over a period of 5 years (on average) and ER options constructed in 3 phases with duration of 1-year per phase.

5. The estimate is based on estimated FY15 price levels, with multiple responsible and responsive bids under a competitive bidding environment for a fixed price lump sum contract (fair market conditions).

6. Levee fill is assumed to be available at borrow sites within 30 miles of the construction site. Three sites that fit this criterion and are likely to supply the project are identified in the Civil Design Appendix. Cost are included for purchase of material, excavation at the borrow site and delivery to the project site.

7. Bench material is generated by the demolition of the existing inboard dike. Minimal to no hauling of bench material is anticipated since dike demolition and bench construction can be performed in one action. Ecotone material is assumed to be delivered and stockpiled on site at no cost to the project sponsor or USACE. Excess material suitable for refuge purposes is often produced by other nearby projects. These other projects will pay fees for placing material at the project site as part of their offhaul costs. Material will still require transport from the stockpile area to the location of ecotone. The cost for this work is included in the LPP Ecotone and NED Bench estimates.

8. Basis for Pricing:
    a. In pricing the estimate, the following sources served as references for cost data:
        i. Historical cost date (for flood/tide gates, operations and maintenance, and material costs)

ii. 2015 Davis Bacon Rates
iii. 2012B MII Equipment Cost Book for Region 7
iv. Construction Economics in Engineering-New-Record (ENR) (for material costs and building market trends)
v. Santi, P.M.; Elifritis, C.D.; and Liljegren, J.A., 2003, Demonstration Projects Using Wick Drains to Stabilize Landslides; *Environmental & Engineering Geoscience*, Vol. IX, No.4, p. 339-350
vi. Alviso Slough Pedestrian Bridge Feasibility Study
vii. Discussions with special subcontractors

b. Direct unit costs include costs for material, labor and equipment, sales taxes, delivery charges, and markups for subcontractors and suppliers

9. General Contractor's fees are included to cover home office overhead of 6%, job office overhead of 12%, profit of 7.65%, and bond of 2%. Office overhead include sales, marketing, accounting, office rental, furniture, equipment and expenses, office support staff, etc. Job office overhead is separate from the explicit field office expenses included in the estimate which does not include staffing, specific utilities, amenities, etc. Profit is the expected compensation for Contractor's undertaking of the project.

10. Monitoring and Adaptive Management Costs were provided by the USACE.

11. Construction Management is equal to 10% of construction costs. Monitoring was the only construction cost that was assumed to have no Construction Management associated with it.

12. Preconstruction Engineering and Design is equal to 20% of construction cost and accounts for Project Management, Planning and Environmental Compliance, Engineering and Design, and Engineering Technical Review, ITR and VE.

13. Construction Supervision and Inspection overhead (SIOH) is not included in the MCACES estimate. The fully marked up total project cost which includes SIOH can be found in the Total Project Cost Summary (TPCS).

14. A cost and schedule risk analysis (CSRA) was performed on project management, contract acquisition, engineering design, environmental, construction, estimate and schedule, economic, and programmatic events. After the PDT concurred on the possible risk events for the project, each risk was then quantified using the USACE approved Crystal Ball software. A contingency of 33% was calculated and applied to all estimates.